

WHAT IS CLAIMED IS:

1. An optical amplifier, comprising:
a gain medium;
an input monitor, operable to measure a power of an
5 ingress optical signal and generate an input power signal
based on the power;
an output monitor, operable to measure a power of an
egress optical signal and generate an output power signal
based on the power;
10 an automatic gain controller including a feedforward
module and a feedback module;
the feedforward module operable to receive the input
power signal generated by the input monitor and to
generate a first control signal based on the input power
15 signal;
the feedback module operable to receive the input
and output power signals generated by the input and
output monitors and to generate a second control signal
based on the input and output power signals; and
20 the automatic gain controller operable to control
pump energy provided to the gain medium based on the
first and second control signals.
2. The optical amplifier of Claim 1, wherein the
25 optical pump is a continuous wave laser.
3. The optical amplifier of Claim 1, wherein the
gain medium is erbium doped fiber.
- 30 4. The optical amplifier of Claim 1, wherein the
input and output power signals generated by the input
monitor and output monitor are electrical signals.

5 5. The optical amplifier of Claim 1, wherein the
first and second control signals generated by the
feedforward module and feedback module are electrical
signals.

10 6. The optical amplifier of Claim 1, wherein the
first control signal is based on the input power, an
aging factor, and the desired gain of the amplifier.

15 7. The optical amplifier of Claim 1, wherein the
control signal generated by the feedforward module is
linearly proportional to the input power signal.

20 8. The optical amplifier of Claim 1, wherein the
control signal generated by the feedforward module is
monotonic to the input power signal.

9. An optical amplifier, comprising:
a pump laser operable to generate pump energy;
a gain medium coupled to the pump laser and operable
to amplify an optical signal with the pump energy to
5 generate an amplified optical signal;
a controller coupled to the pump laser and the gain
medium, the controller operable to control the pump laser
based on feedforward monitoring of the optical signal and
feedback monitoring of the amplified optical signal.

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10. The optical amplifier of Claim 9, the
controller further operable to control the pump laser
based on an aging factor of the pump laser.

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11. The optical amplifier of Claim 9, the
controller further operable to control the pump laser
based on a desired gain of the amplifier.

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12. The method of Claim 9, wherein the optical pump
comprises a continuous wave laser.

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13. The method of Claim 9, wherein feedforward
monitoring is based on a linear relationship between the
input power and a pump current of an optical pump.

14. The method of Claim 9, wherein feedforward
monitoring is based on a monotonic relationship between
the input power and a pump current of an optical pump.

15. The method of Claim 9, wherein feedforward monitoring is based on a linear relationship between the input power and a pump current of a set of optical pumps.

- 5 16. The method of Claim 9, wherein feedforward monitoring is based on a monotonic relationship between the input power and a pump current of a set of optical pumps.